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For I was told by a great master of horses, who had many years experience of Stallion barbs, the best he could buy, that the bastard barbs, descending from the best *English* mares he could obtain, were constantly better shaped, and better for the saddle and other stronger service, than their Syres. But I turn'd here aside to name *Ireland*, because the rot of sheep is not so ordinary in *Ireland* as in *England*, and they are nearer *Spain* and *Tangier* than we are: And they are highly to be commended for their late industry, both in the linnen and Woollen manufactures; which may nobly provoke our emulation. And whilst *England* and *Ireland* strive to excel each other in good things, we draw closer to a perfect union, and to give strength and assistance to each other mutually. Sir, you having been long accusom'd to bear the burthen of useful Inquiries, and to promote the common good, you'll pardon this freedom in, &c.

An Account of some Books.

- I. *About the Excellency and Grounds of the MECHANICAL HYPOTHESIS, some Considerations occasionally propos'd to a Friend by R. B. E. Fellow of the R. Society.* London. 1674. in. 4°.

THIS Discourse is annexed to another, entituled, *The Excellency of THEOLOGY, compar'd with NATURAL PHILOSOPHY*; which though it be not of a direct tendency to the design of these Tracts, yet doth it occasionally mention divers things, fit to be taken notice of by a Student of Natural Philosophy; such as are the useful Hints and Directions to guide him in the making Experiments skilfully and warily (p. 118, 119;) to encourage him to the Improvement of Natural Philosophy, now that the *Mechanical Hypothesis* is sufficiently settled, and the right Methods of Inquiring are found out (p. 171.) to instruct him how injurious *Systematical* Writers are to the true search of Nature (p. 193.) and what care is to be had of establishing *Philosophical Hypotheses* (p. 208.) as also how much remains yet to be discover'd of Nature (p. 174, 176, 178.) and how Philosophy hath recoiled by the *Aristotelians* laying aside Mathematicks, and disputing of Generals (p. 204.) and by whom the Experimental and Mathematical Way of Philosophizing hath been restored and brought

brought into esteem (p. 205, 206:) Among which particulars there occur also several notable Considerations about the Nature of Body and Sensation (p. 144, 145. 153;) and divers Instances of Philosophy improved (p. 209, 210, 211;) not only in reference to the understanding of the sensible Qualities of things, and their Causes, (p. 211, 212;) but also as to Practical Inventions and Instruments (p. 213,) &c.

But to pass to that Differtation, which is more within our Sphere, *viz.* Concerning the *Excellency* and *Grounds* of the *Mechanical Hypothesis*; the Noble Author thereof maketh it his business to evince, that the other *Hypotheses*, entertain'd by the several Sects of Philosophers, are so far from overthrowing the *Mechanical*, that they will either be foiled by it, or found reconcileable to it. In the doing whereof, having first declared his meaning about the subject discours'd of, (*viz.* the *Mechanical Philosophy*;) he succinctly and plainly delivers the particulars that recommend it.

1. Of the Principles of things *Corporeal* (for such only he here treats of;) none can be more *few* without being insufficient, or more *primary*, than *Matter* or *Motion*.

2. The natural and genuine effect of variously determin'd *Motions* in portions of *Matter*, is, to divide it into parts of different *Sizes*, and *Shapes*, and to put them into *different Motions*; the consequences of which are, *Posture*, *Order*, *Situation* and peculiar *Textures*.

3. The parts of *Matter* endow'd with these *Catholick affections* are by various associations reduced to Natural Bodies of several kinds, according to the plenty of the matter, and the various Compositions and Decompositions of the Principles; which all suppose the common Matter they diversify: And these several Kinds of Bodies, by Vertue of their Motion, Rest, and other Mechanical Affections, which fit them to act and to suffer, become endowed with several Kinds of Qualities, and with those that work upon the peculiarly fram'd Organs of Sense, whose Perceptions by the animadversive Faculty of the Soul are Sensations.

4. These Principles *Matter*, *Motion*, *Rest*, *Bigness*, *Shape*, *Posture*, *Order*, *Texture*, being so *simple*, *clear*, and *comprehensive*, are by our Author shown to be applicable to all the real *Phænomena*

nomena of Nature, which seem not explicable by any other not consistent with these. For, *saieth he*, if recourse be had to an Immaterial Principle, it may be such an one, as is not intelligible; and however it will not enable us to explain the *Phænomena*, because its *manner* and *way* of working upon things Material would probably be more difficult to be *Physically* made out, than a Mechanical account of such Effects. And as to an Immaterial *created* Agent, we cannot conceive, how it should produce changes in a Body without the help of Mechanical Principles, especially *Local motion*; and accordingly we find not, that the Reasonable Soul in Man is able to produce what changes it pleaseth in the Body, but is confin'd to such as it may produce by determining or guiding the Motions of the Spirits, and other Parts of the Body, subservient to voluntary Motion.

5. And if the Active Principles resorted to, be not Immaterial, but Corporeal, they must either in Effect be the same with those lately mention'd; or, because of the great Universality and Simplicity of the same, the New ones propos'd must be less general than *they*, and consequently capable of being subordinated or reduced to those asserted by our Author, which by various Compositions may afford matter to several *Hypotheses*, and by several Conditions afford minute Concretions exceedingly numerous and durable, and consequently fit to become the Elementary Ingredients of more compounded Bodies, being in most Trials Similar, and as it were the Radical Parts, which may after several manners be diversified, as in a Language the Themes are by *Propositions*, *Terminations*, &c. So that the fear, that so much of a *New* Physical Hypothesis, as is *true*, will overthrow or make useless the *Mechanical* Principles, is, as if one should fear, there will be a Language propos'd, that is discordant from, or not reducible to, the Letters of the Alphabet.

II. “ **I**N my last, (N^o. 102.) I promised a fuller account of
 “ *Mr. John Smith's ENGLANDS IMPROVEMENT*
 “ *reviv'd*, in a Treatise of Husbandry and Trade, by Land and
 “ Sea; plainly discovering the several ways of improving the
 “ several sorts of waste and barren grounds, and of enriching all
 “ Earths, with the natural quality of all lands; and the several
 Seeds

“ Seeds and Plants, which naturally thrive therein, observ’d,
 “ &c. Together with the manner of Planting all sorts of
 “ Timber-trees and Under-woods: Experienced in 30
 “ Years Practice, and digested into Six Books.

The Books are brief, and all contain’d in a thin 4°; address’d to the Lord Viscount *Brouncker*, President of the *R. Society*: Recommended for the Usefulness and Publick Benefit by the worthy *John Evelyn* and *Samuel Woodford Esqs*; both Fellows of the same society, with ample and hearty testimonials. The most worthy and most generously obliging are least of all prone to be envious, but do rejoyce in every hand that brings the best assistance to promote the publick weal:

Liber, iners vitium mores non exit in altis, } Ovid.
Utque latens imâ vipera serpit humo

I beg leave to add this free note: if the waists and abuses of forrests herein particularized shall for the future be avoided; and the waists, commons, and bald hills be henceforth cultivated, as is hereby directed; and if our nobility and wealthy gentry shall follow the royal and most illustrious examples, and take heed of chusing or trusting such ignorant and lazy stewards and bayliffs, as *Columella* rejects; we may hope, in a short time to see *England* as much excel it self in rural improvements, as our *metropolis* is advanc’d from her late confusion and ashes by her present and speedy restoration. And to confirm this *item*, we may already see, how largely our rural affairs have flourish’d, since Mr. *Evelyn* publish’d his excellent Volume of *Sylva* and *Pomona*, to direct and encourage the Plantation of Forrefts, Woods, Groves, and the richest Cyder-Orchards; which *Volume* had not its due Fulness, nor compleat Emendations, till *Anno* 1670. in a second Impression.

He must needs be a lazy and ignorant Steward, that cannot provide a nursery of *Mulberry-trees*, nor can yet understand that from this diligence the greatest part of the wealth of *France* is now (and but lately) maintain’d. If God shall be pleas’d to bless the fruits of the Earth, we have fair and visible grounds to hope that good and wholesome Cyder (better than was known to our Forefathers) will the next following year be at easy rates, to be had on all the Roads of *England* from the remotest Western Parts to *London*, and a 100 Miles deep towards the North
 from

from our Southern coasts: And the richer counties in the East will disdain to come behind, nor can fail, if they take equal care that their cyder be good and wholsome. And this will be great satisfaction to all travellers, who by experience do find the salubrity of cyder, or do disgust the many changes and mischances of beer, by ill brewing, or footy malt, dried on wood-fires, &c. And if gentlemen, when they return from foreign parts, would be pleas'd to bring over such as have skill in planting vineyards, ordering the whole vintage, and making wine, we might reasonably hope to see as great advancement of *Vineyards* within 5 or 6 years, as we do of *Orchards* this day:

Sed tamen est Artis tristissima Janua nostræ,

Et labor est unus, tempora prima pati.

Dimidium facti qui bene cepit habet.

Janus being asked, why *Frankincense* and *Wine* should be offer'd to him first before all other Gods?

Omnia principiis, inquit, inesse solent. Ovid. *Fast.* l. 1.

Good beginnings run a great way: and justly we give the first honour to him that leads the way, or opens the portal, by a fair example, which seldom fails of a good effect among the ingenious.

But to pass to the Book itself, the Frontispiece to it is so copious and expressive, that I may be the briefer in my Extract.

In the 1st Book. Trade supported by Navigation. His Majesties Sovereignty in the *British* Seas justified by the most ancient and all modern Records, and the practice of other Nations: Forrest and Timber the strength of the Crown and Kingdoms. Hammers and Furnaces for Iron, great wasters of wood and timber; and horrible waists committed by keepers, forresters, and others.

In the 2d Book. Directions to make a serviceable and profitable fence, and the charges. Some ground unkind for trees. The original of plants. The choice of seed and plants.

In the 3d Book. Directions to plant one acre of land several ways, and at several distances. The number of seed and plants given to plant a 1000 acres of land at several distances. The best season of the year, and the manner of plowing ground to sow seeds, or set plants. Several observations for the choice and ordering of ground for the diversity of seed; for transplanting trees, underwoods; for transplanting trees of great bulk and growth; for dressing and pruning trees. The growth and age of timber-trees almost incredible.

In the 4th Book. The profit of planting a 1000 acres of land with feed, or sets for timber-trees and under-woods. An Account given of 29548000 acres of land in *Eng'land*, besides that which is allow'd for the high-ways. Loss of ground by reason of the fence. The charges of plowing and planting feeds and sets for Timber-trees and Under-woods. The charges of delving lands for the same Uses.

In the 5th Book. Of planting pleasant Walks with Timber-trees and Groves. The charges and profits of keeping a 1000 tame Conies. Of Sheep. Several directions to make an Aviary; also a Fish-pond. Of Pigeons. The choice of Cows for a Dairy. A view of rural Amœnities, *p.* 177, to 183. Again, a rural Prospect of a well-order'd Village, *p.* 190, to 193. Directions to plant Herbs, *p.* 185. and Hops 188. An Alphabet of Herbs for a Kitchen-garden, and vulgar Medicines from Vegetables for Country-farmers.

The 6th Book. *Anno* 1633, he was sent by the Earl of *Pembroke* for the discovery of the Isle of *Shetland*; to observe the manner of trading, the profits and customs thereof, the settling of a staple, the building of store-houses, the viewing of ground on shore for landing and drying of nets, of the ordering and drying of fish, the manner of the *Hollanders* fishing for herring with buffes, and with other vessels for ling and cod; of all which he here publishes his Journal, beginning *April* 27, 1633. And here he gives a particular account of the chief Islands about *Scotland* (in all above 300, saith *Speed*; and the author takes notice of more Islets than can easily be numbred.) Of the *Hamburgers* fishing on other Islands there. What fish the inhabitants do catch, and how. The dangerous rocks, and violent winds. That *Salt pans may be set up in Shetland, and good salt made to serve all the fishing-fleet*, *p.* 255. The *Scots* in *Shetland* were provided of hooks and lines, for the taking of ling and cod; nets, for the taking of herring; strong beer, biskets, wheaten meal, salt, pease, fruits of all sorts, strong water, *Mommouth* caps, and many other particulars, *p.* 256. The inhabitants of the Isle of *Ounst* usually have a bark that they trade with to *Norway*, where they may buy timber for houses, ready framed, deal-boards, tarr, ships, barks, and boats of all sorts.

In

In one of their small fishing-boats, rowing with two men, sometimes with four, they do usually bring to shore, every morning that they go to sea, 50 or 60 ling and cod, and they take many barrels of herrings: For the *Hollanders* busses driving at sea do break the shole, and then the herrings fly near the shore through the sounds, where the *Scots* take them with their small boats and nets. Had they better tackling they would do better, p. 256, 257. *And, which is more than all, they have skilful and hardy fishers to endure wind and weather, and to be content with their own provisions. Here a London-purse, or a full English-purse, would do wonders; and the time draws near to prepare for the business.* In *Shetland* they had then fat oxen at 3 l. each ox; fat sheep at 2 s. or 2 s. 6 d. each fat sheep; conies, easie to be taken in abundance; and fowl, &c. p. 257. He bought in the *Isle of Ounst* 11655 gild ling of the largest size, (if smaller, he had two for one, or three for two,) and 835 gild cod, which are the largest cod, all taken by the inhabitants of *Ounst*; all brought to his booth, or the place of his abode, as soon as they were caught, every morning. The large gild ling did cost him but 3 d. a-piece; the gild cod but 2 d. a-piece. They were salted aboard the ship, p. 254. *Muffet* values a ling of 2 years old at a Noble, as the usual rate in his time, about 60 years since, or upwards; and the price of flesh in *London*, and other parts of *England*, may now justly raise the price of fish.

Our Author goes on to shew, that trading is the life of all the habitable world; how it first raised the *Venetians*, then the *Genouese*, next the *Portuguese*, then the *Easterlings*, lastly the *Hollanders* above all, by the fishery, p. 258, 259, &c. He proves by accurate Instances, and grounded Calculations, that (so long ago) *Hollanders*, and other Foreigners, gained by their fishery from the coasts of *England*, *Scotland*, and *Ireland*, to the value of millions of pounds yearly. And hence is their abundance of shipping, pilots and seamen. And he shews how the *Hollanders* do exchange their fish to drive their main Trade, and to circulate the wealth in the world into their own centers and purses.

Compare herewith Mr. *Evelyn's* lately publish'd ingenious discourse of the *Original and Progress of Navigation and Commerce*, especially p. 107, 108, 109, &c. printed in *London* in Octavo.

III. Davidis von der Beck, *Mindani*, Experimenta & Meditationes circa *Naturalium Rerum Principia*, &c. Hamburgi 1674. in *Octavo*, dedicated to the Royal Society.

BEfore any thing be said here about the particulars contained in this treatise, the publisher thinks himself obliged to observe to the reader a great mistake which the learned author of this book commits in ascribing these *Philosophical Transactions* to the *Royal Society*, as if those of that illustrious body were the authors and composers of them; whereas 'tis well known, and hath been several times declared, and inculcated in these

* See Numb. 12. p. 213. very *Traacts* *, that 'tis far otherwise, and Numb. 86. p. 5047. that none but one particular member of

the said society, is the composer and publisher of the same; which being thus premised, 'twill not be amiss further to take notice here of the occasion that hath been given to our author of writing this book, which seems to have been the last clause of the description formerly given in *N. 92.* of these *Traacts*, p. 5192. concerning the pre-existence of the fixt and alcalifate salts in mixts before calcination, and the causes of volatilization, both treated of by our author in his *Epistle* to Dr. *Langelot*, abbreviated in the said *Number*; which doctrine of his, that he might clear up the better, he thought fit to deliver his opinion about the first principles of natural things; which he endeavours to do in this treatise: *First*, By rejecting the *four peripatetick Elements*, and the received *Principles* of the *Chymists*, from being the first principles of natural bodies *

* See and compare herewith the Honourable R. Boyle's Sceptical Chymist throughout; publish'd Anno 1661. in *English*, and Anno 1662. in *Latin*.

Secondly, By asserting *Elementary Water* and *Seeds* to be the true principles of them, and making such water the sole *Material*, and the *Seeds* of bodies, the sole *Formal* principle, and affirming these two so to concur to the constitution of all corporeal beings, that the *former* is the matter common to them all, and the *latter* the form diversifying that indifferent matter into an innumerable variety of bodies, by means of an universal celestial acid, the proper seat of all feeds, and coagulating this elementary water into the various

various bodies of the universe *.

Here he takes occasion to discourse largely of the nature of *fire*, the better to evince, how *that* deserveth to be counted a principle of natural bodies, after he had affirmed, that *Acids*, which he maketh to be fiery substances, as they are the domicil of Seeds, by their motion and coagulating power do diversify the common elementary Water into those various bodies, of which this world is made up.

Fire then, according to him, is a most swift motion of a Volatil acid sulphur; the motion of particles being the *Form* of fire, and the volatil acid parts the *matter* that's moved. Where he maketh a digression to shew the Inebriating power of *Acids*, and how effectual *Alcalies* are to retund and mortifie that vertue. Which done, he proceeds to elucidate further the nature of fire from oyls and fats, and to make it out by experiments, that the matter of the flame of burning Oyls are their *Acids* particles; for as much as oyls prepar'd by evaporating Spirit of wine from them, or by abstracting them from quick-lime, or by distilling them even from bricks, do not flame so much as they would do otherwise; which way of preparing oyls he conceives to consist in nothing but the destruction of the Acid particles thereof; observing further; that candles made of mutton-Suet burn away much sooner than those made of other Suet, by reason of the abundance of acid particles in the same, far exceeding those in other kinds of fat, &c.

Having dispatch'd this argument, he goes on to prove more fully; *first*, that the seeds of things are harbour'd in some acid or other, more or less manifest: *secondly*, that all bodies are from water coagulated into various species's by seeds. Where he infers, that that seminal acid of fats being consum'd by flames, the remainder, now depriv'd of that acid, is resolv'd into elementary water, and insensibly dissipated into vapours; as the aqueous parts of the most rectified spirit of wine, being put into flame, fly away together with the spirit in vapour. Where he takes no small pains to demonstrate, (as his expression is) the acidity of flame; and withal to shew, that in all inflammable bodies

* *Quære*, What is meant by this Elementary Water? And, Whether, if it be Insipid Water, or any, how simple soever it seem, may not be reducible into something else? And what, if this water, here call'd Elementary, should be all convertible into Earth? As it hath been actually transmitted into it by Mr. Boyle. See his Book of the Origin of Forms and Qualities p. 251. exp. 9th.

dies there are acid particles, that may justly be called *fire*, and that there is such a fire in the stomach of all Animals, and even in the ventricles of all Muscles; (for, according to him, every Muscle and part of the Body hath its peculiar ventricle or stomach, which impregnates the ailments convey'd to them with the seminal acid of the part, whereby the nourishment is turn'd into the nature of this or that muscle, or nerve, vein, artery, or any other part.) And as this fire is by him placed in all Animals, so he endeavours to prove it to be in all Minerals and Vegetables, whereby the matter, convey'd to them for their nourishment and increase, is, according to the diversity of the Seminal acid sulphur, converted into this or that mineral or plant.

Again, in that part of this book, where the author maketh it his business to prove, that the *Tria Prima* of the Chymists are not the true principles of natural things, he undertakes, where he treats of that reputed principle, *Salt*, to bring clearer proof of what was formerly said in *Num. 92.* of these *Traçts*, not to have been sufficiently prov'd, *viz.* that the fixed alcalisate salts do as such by no means pre-exist in bodies before calcinations; after he hath first distinguish'd between the *fixt* tartareous salt that is in all the juyces of vegetables really and formally, without calcining them, (of which he saith he speaks not,) and the *fixt Alcalisate* salt of the tartar *e.g.* of wormwood, which he positively affirms not to have formally pre-existed in the body before calcination, because he will have that produced by the colliquation made by the fire of the Volatile salts with the terrestrial parts of the body; and the union of the terrestrial parts with the saline to be the sole cause of fixity: as on t'other hand he maketh the separation of those earthly parts the true and only reason of volatility. Which whether he hath evinced by such irrefragable proofs, as he thinks, we must still leave to truly Philosophical and sagacious chymists to judge; and shall only take the liberty to demand, whether he be sure, that two acids may not without any terrestreity be so combined and brought into such a texture, as to afford a fixt body, that shall endure a considerable degree of heat before it be sublimed or volatilized? Which that they may, we have hopes to find proved experimentally in an Essay of Mr. *Boyle*, in due time to be publish'd about the mechanical production of the qualities of Bodies.

As to the principles espoused by our author, *viz. water* and
seeds,

Seeds, and the large proofs he brings to assert them, we shall here say nothing, but desire the intelligent reader to compare his whole discourse with that of the noble author of the considerations about the *excellency and grounds of the mechanical hypothesis*; which we have already given some account of above.

Mean time we cannot but commend this philosopher for taking particular notice of that admirable work of *nutrition*, whereby, *for instance*, an Ox grows in all and every part of his, whether it be muscular, bony, cartilaginous, nervous, &c. only by grass and plain water, which passing into the head, heart, lungs, liver, arms, feet, &c. do become each of those parts respectively, and doing so, give us to consider, that each part contains something peculiar, that is not in any other part, by means whereof the aliment convey'd thither is converted into the nature of (*e.g.*) the heart, not the liver, the lungs, not the spleen, &c.

But, how he comes to make such an estimate, that that part of a seed, in which properly the prolific virtue lodgeth, and which is strictly called the *geniture*, is no more than the two thousand eight hundredth part (2800) of its body; and who are all those *genuin* philosophers whom he appeals to, p. 173, 264, I should be very glad to be inform'd of.

After he hath amply discoursed in general of the nature of seeds, and the seminal idea or character, he proceeds to particulars, applying his general discourse to the generation of animals, vegetables and minerals. Of *animals* he taketh in hand the noblest of them, *Man*, and giveth a large account both of his formation in the womb, and his nutrition when brought into the world. Where do occur many observables, touching the active power of the seed of the Female, the production of viviparous animals from eggs, the manner of conception, the gathering of the seed from all the parts of the animal, and the imprinting of the particular characters of each part in the blood, moving through the whole body, and by the blood, as a vehicle, to the organs of generation: further, the cause of the determinate sizes of animals, especially of men, pigmies and giants; the strange force of imagination exemplified; the sufficiency of the seed of the male to impregnate many eggs at once, especially of a cock; the cause of Monstrosity; difference of sexes; and death; of the remaining of the idea's or characters in the bodies of
animals

animals after death; to which he joyneth his thoughts about the refuscitation of plants.

Having finish'd this part concerning *generation*, he goes on to shew, how *nutrition* is materially perform'd in all sorts of bodies, viz. by water alone; which he endeavours to make out by reason and authority, particularly alledging for his authority *Van Helmont* and Mr. *Boyle*; the latter of which I much apprehend to be mis-understood by our author in this particular; as he is also mistaken by the same, when he is introduced as a person judging, that *Van Helmont* (for whom he hath yet a just esteem,) by reason of the incredible veracity of his experiments is not easily to be disbeliev'd; for which allegation, I think, no place of Mr. *Boyle* can be produced out of any of his works to run in that latitude.

And as this writer believes *water* to be the material principle of all things, so he attempts to shew, what that power and virtue is, which coagulateth the water into solid bodies, and applieth it to these seminal characters, which he had afore discoursed of; and this he maketh to be the *igneous and vivifying spirit*, lodged by the creator in the *sun*, and convey'd to the several bodies of the universe by the air and wind, imbu'd with those vital and benign rays of the solar globe: which *spirit* though it be, according to him, but one, and, before it be incorporated, indifferent to make fecund the bodies of all the three kingdoms; yet it acquires its specification, or is determined according to the determinate nature of the seeds; and the most subtile parts of that spirit being acid, they do by this acid power coagulate the water into solid bodies.

L O N D O N,

Printed for *John Martyn*, Printer to the *Royal Society*, 1674: